



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Virginia

Conservation Stewardship Puts Muddy Creek and Lower Dry River Watersheds on Path to Recovery

Introduction

Muddy Creek and Dry River were placed on Virginia's 303(d) List of Impaired Waters in 1996 and 1998 respectively for violations of the fecal coliform water quality standard. In addition, both streams were listed for violating the nitrate public drinking water standard, while Muddy Creek has an additional benthic (aquatic life) impairment due to excess inputs of sediment and phosphorous.

Various agricultural and residential best management practices (BMPs) have been installed through a Total Maximum Daily Load (TMDL) implementation project to help address the problems. These BMPs include: dairy loafing lot management systems with loose housing, stream protection, grazing land protection, small grain cover crops, side-dress application of nitrogen on corn, septic tank pump-outs, septic system repairs and replacements, and the installation of alternative waste treatment systems. Significant improvements in fecal coliform counts have been observed in both streams since implementation efforts began in 2001, with Lower Dry River approaching fecal coliform levels necessary for de-listing. In addition, substantial improvements have been observed in the benthic community in Muddy Creek, indicative of reduced environmental stress on the aquatic community.

Project Background

Muddy Creek and Lower Dry River are located in Virginia's Shenandoah Valley in Rockingham County approximately fifteen miles west of the City of Harrisonburg. Both streams drain into the North River, which empties into the South Fork Shenandoah River. According to the Chesapeake Bay Foundation's 2004 Manure Report¹, Rockingham County is listed as the leading turkey producing county in the nation and has more excess manure on its animal farms than any other county in the nation. Due

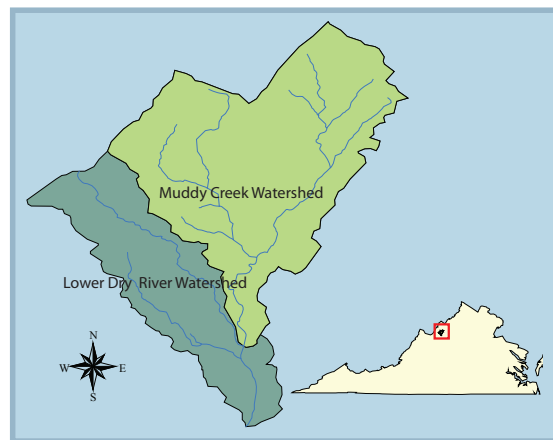


Figure 1. Muddy Creek and Lower Dry River watersheds.

to the intensity of agriculture in these watersheds, significant loads of bacteria were identified from pasture and cropland runoff, and from livestock in streams. In addition, failing septic systems and straight pipes were identified as significant sources of bacteria in the watersheds.

The Muddy Creek and Lower Dry River areas are home to a large Old Order Mennonite community that has historically installed agricultural best management practices voluntarily without accepting cost share assistance. This community has played an important role in improving water quality in Muddy Creek and Lower Dry River.

Agriculture is a predominant source of bacteria in Muddy Creek and Lower Dry River. According to estimates in the TMDL studies developed for these watersheds, direct deposit of waste by livestock in streams constitutes approximately 86% of the non point source fecal coliform load in Muddy Creek and 36% in Lower Dry River. The TMDL studies call for a 99% reduction in direct deposition of waste from livestock in Muddy Creek, and a 84% reduction in Lower Dry River. A 100% reduction in uncontrolled discharges, which are illegal in the Commonwealth of Virginia, is called for in both watersheds. According to the TMDL Implementation Plan, it is estimated that a total of 44 miles of stream fencing will be necessary to achieve these direct deposit reductions in Muddy Creek, while 20 miles will be needed in Dry River.

1. Chesapeake Bay Foundation. "Manure's Impact on Rivers, Streams and the Chesapeake Bay: Keeping Manure Out of the Water." July 28, 2004. Accessed February 5, 2007. < www.cbf.org/site/DocServer/0723manurereport_noembargo_.pdf?docID=2143>.



Project Highlights



Figure 2. Voluntary livestock exclusion fencing in Muddy Creek.

Residential and agricultural conservation successes have largely been the result of partnerships between the Shenandoah Valley Soil and Water Conservation District (SVSWCD) and several state agencies including the Virginia Departments of Conservation and Recreation and Environmental Quality, Virginia Cooperative Extension, Rockingham County Farm Bureau, and USDA - Natural Resources Conservation Service. Numerous tours have been held to promote the agricultural and residential BMPs offered under the TMDL implementation plan, along with presentations at civic clubs throughout the watersheds, postcard mailings advertising the program, personal contacts with farmers and residents, and meetings updating the community about the water quality improvements.

Since there is such a high livestock density per acre in the Muddy Creek and Lower Dry River watersheds and numerous dairy farm operations in close proximity to a stream, the installation of loafing lot systems with loose housing has helped to control runoff of manure and sediment to the streams. Installation of this BMP allows farmers to store manure so that it can be applied at the most appropriate times during the growing season on land where it can be better utilized.

The two biggest farming advantages noted in the installation of agricultural BMPs in the Muddy Creek and Lower Dry River areas are being able to store and better utilize nutrients and exclude livestock from streams. As of April 2006, there has been ten miles of exclusion fencing installed in the Muddy Creek and Lower Dry River watersheds along with an average of 1,200 acres per year of cover crops planted for uptake of nutrients. Over 80% (8.3 miles) of the exclusion fencing installed in the watersheds was done voluntarily without the use of cost share funds. Homeowners have also played a large role in the improvements made in water quality in these areas. Over the past four years, there have been thirty septic tank pump-outs, thirteen septic system repairs and replacements, and five alternative septic system installations to replace failing septic systems.



Figure 3. Alternative waste treatment system in Muddy Creek.

Results

The Virginia Department of Environmental Quality (DEQ) monitors the impaired streams through the agency's ambient monitoring program. Monitoring results from the ambient program are then used to gage the progress made towards achieving water quality goals. According to DEQ monitoring data throughout the Shenandoah Valley from 1995-2000 and 2000-2004 (47 stations total), Dry River ranked as the 5th most improved stream and Muddy Creek the 6th most improved in the Valley. Significant improvements in violation rates of the 1,000 colony forming units/100 mL instantaneous standard for fecal coliform have since been observed, with Muddy Creek dropping from a high of a 91% violation rate in 1998 to a 44% violation rate in 2005 (Figure 4). Similar improve-

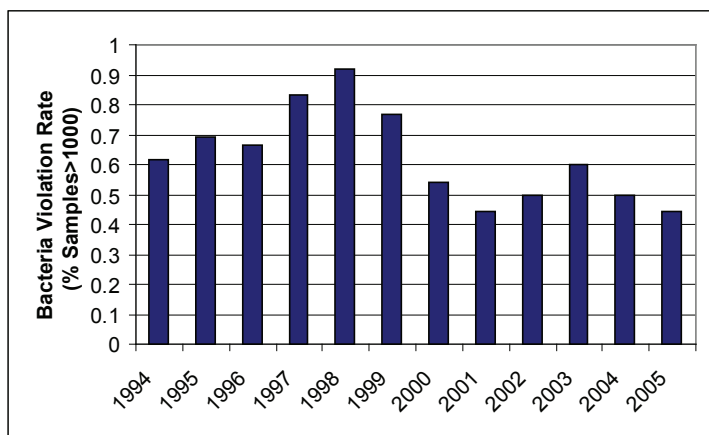


Figure 4. Violation rate of the 1,000 colony forming units/100 mL instantaneous standard for fecal coliform in Muddy Creek

ments were observed in the Dry River, which dropped from its highest violation rate of 50% in 1996 to 11% in 2005 (Figure 5). Significant improvements have also been observed in the benthic community in Muddy Creek, which received a stream health score of slightly impaired in 2004 (77%). This score is up from a low of severely impaired (16%) in 1999 (Figure 6). Probably the best news in monitoring results yet is the trend in the North River itself,

which benefits from the combined efforts in all upstream tributaries. Of the 13 samples collected in the past two years (2004 and 2005), there have not been any violations of the bacteria water quality standard.

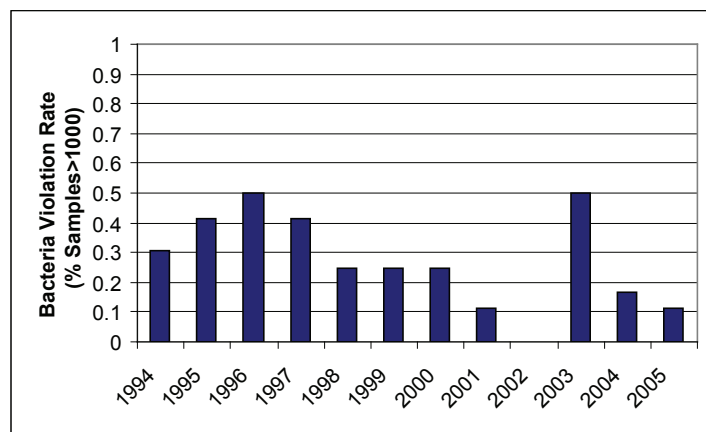


Figure 5. Violation rate of the 1,000 colony forming units/100 mL instantaneous standard for fecal coliform in Lower Dry River.

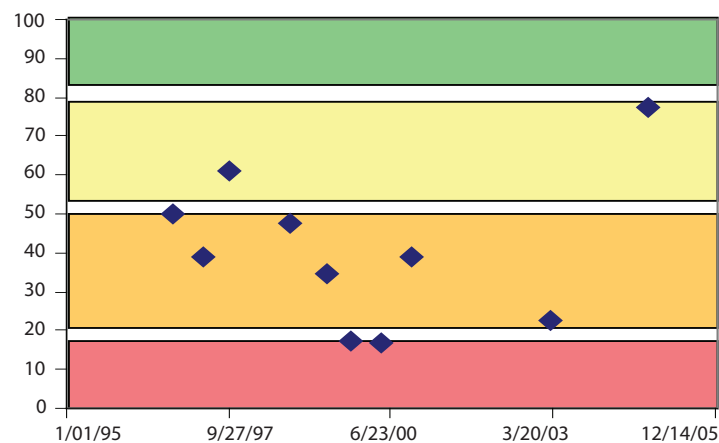


Figure 6. Stream health score for the benthic population in Muddy Creek. Red=severely impaired, Orange=moderately Impaired, Yellow=slightly impaired, Green=not impaired.



Partners and Funding

Several partners have contributed to the success of this project including the Shenandoah Valley Soil and Water Conservation District, Virginia Departments of Conservation and Recreation and Environmental Quality, Virginia Cooperative Extension, Rockingham County Farm Bureau, and Natural Resources Conservation Service.

In addition to these partners, the Old Order Mennonite community has displayed a stewardship ethic that has greatly influenced improvements in water quality seen throughout the TMDL implementation project. This community has installed extensive voluntary best management practices, including stream exclusions and crossings, loose housing barns, and numerous manure storage units. Due to religious beliefs, this community does not accept any financial assistance for installing BMPs. However, the community strongly recognizes the connection between land use and water quality and took the initiative to install environmentally friendly practices to control runoff from nutrients and sediment from entering the streams. Technical assistance, funded with EPA Section 319 funds and administered by the SVSWCD, was provided to the Mennonite community. Over the past five years, EPA Section 319 funds have been used to support two full-time staff positions, which have lead to the admin-

istration of \$512,750 of cost share for agricultural BMPs and \$71,250 for residential BMPs. Other major sources of funding include \$130,000 from USDA/EQUIP. These funds were used to install BMP's not only in Muddy Creek and Lower Dry River, but also in Mill Creek and Pleasant Run, all of which are part of the North River watershed.

Photo: Mike Phillips, Shenandoah Valley SWCD



Figure 7. Dairy loafing lot management system

DCR is encouraging stakeholders in other watersheds to become familiar with what has been accomplished in the Muddy Creek and Lower Dry River watersheds based on citizen-based conservation stewardship. Time has demonstrated that stewardship and the TMDL process can bring water quality improvements to local watersheds in Virginia.

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